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09/774,826	01/30/2001	Mark A. Plummer	970019 USA	2489

7590

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EXAMINER

GRIFFIN, WALTER DEAN

ART UNIT

PAPER NUMBER

1764

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DATE MAILED: 03/19/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/774,826

Applicant(s)

PLUMMER ET AL.

Examiner

Walter D. Griffin

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 02 May 2001.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-25 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-14, 17-20 and 23-25 is/are rejected.
- 7) ☒ Claim(s) 15, 16, 21 and 22 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2.
- 4) ☐ Interview Summary (PTO-413) Paper No(s) \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

## DETAILED ACTION

### *Claim Rejections - 35 USC § 112*

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 4, 5 and 7 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 4 is indefinite because the expression "substantially more membrane permeable" is a relative expression that renders the claim indefinite. The expression is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention.

Claim 5 is indefinite because the expression "substantially smaller" is a relative expression that renders the claim indefinite. The expression is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention.

Claim 5 is also indefinite because it is unclear how the sweep stream is compared to the feed hydrocarbon. Is it a smaller amount by weight, volume, or something else?

Claim 7 is indefinite because it is unclear what streams are encompassed by the expression "conventional refinery hydrocarbon stream". Therefore, the scope of the claim cannot be ascertained.

*Claim Rejections - 35 USC § 102*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 4, 7, 9-13, 17, 19, and 23 are rejected under 35 U.S.C. 102(b) as being anticipated by Cahn et al. (3,244,763).

The Cahn reference discloses a process for separating a component from a fluid mixture. A specific separation disclosed is the separation of a mercaptan (i.e., thiol) from a hydrocarbon stream. The claimed "conventional refinery hydrocarbon stream" of claim 7 is not distinguished over the disclosed hydrocarbon. The process comprises conveying a feed stream past one side of a solid membrane and conveying a re-extraction fluid (i.e., sweep stream) past the other side of the membrane. The component to be separated from the mixture is then transported from the fluid mixture to the sweep stream. The removal of mercaptans from a hydrocarbon feed would necessarily result in a sulfur-enriched stream and a substantially sulfur-free hydrocarbon stream. Since the mercaptans are transported across the membrane, they are more membrane permeable than the hydrocarbons. In other words, the membrane is more selective for the mercaptans than the hydrocarbons. The disclosed membrane would necessarily comprise compounds as in claim 11. The membrane also contains a solvent that is selective for the component being removed. Caustic is disclosed as being effective for the removal of mercaptans. This selective solvent is indistinguishable from the claimed facilitated transport liquid of claim 13 and claim 19. The re-extraction fluid (i.e., sweep stream) that contains the separated component may be distilled to

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separate the re-extraction fluid from the component. See col. 2, lines 11-28 and 54-63; col. 3, lines 8-26; col. 4, lines 1-9, 36-53, and 65-71; and col. 5, lines 36-44.

### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 2, 3, 5, 6, 8, and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cahn (3,244,763).

As discussed above, the Cahn reference does not disclose the sweep stream composition of claims 2 and 3, does not disclose the relative amounts of sweep and feed streams as in claims

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5 and 6, does not disclose the feed composition as in claim 8, and does not disclose the recycling of the sweep stream as in claim 18.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the process of Cahn by using a sweep stream with the claimed composition because Cahn discloses that the sweep stream must be immiscible with the selective solvent (i.e., facilitated transport liquid). Hydrocarbons such as those claimed would be immiscible as required and therefore would be expected to be effective as a sweep stream.

It also would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the process of Cahn by utilizing the claimed relative amounts of feed and sweep streams because one would utilize any amount including those claimed to achieve the desired result of mercaptan removal.

It also would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the process of Cahn by utilizing the claimed feeds because these feeds are hydrocarbons as disclosed by Cahn and therefore would be expected to be effectively treated in the disclosed process.

It also would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the process of Cahn by recycling recovered sweep stream because costs would be reduced thereby improving the economics of the process.

Claims 14 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cahn (3,244,763) in view of Connaught et al. (4,417,986).

As discussed above, the Cahn reference does not disclose the facilitated transport liquids of claims 14 and 20.

The Connaught reference discloses that amines and alcohols promote the solubility of mercaptans in caustic. See col. 2, lines 52-62.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the process of Cahn by utilizing amines and alcohols as the facilitated transport liquid as suggested by Connaught because these compounds fit the requirements disclosed by Cahn as being essential (i.e., selective solvent for the component being removed and immiscible with the feed) to the process. Therefore, one would expect these compounds to be effective in the process either combined with or in place of the disclosed caustic selective solvent.

Claims 24 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cahn (3,244,763) in view of Carnell et al. (4,978,439).

As discussed above, the Cahn reference does not disclose hydrogenating as in claims 24 and 25.

The Carnell reference discloses the hydrotreating of a sulfur-containing stream obtained from a membrane separation process. See col. 2, lines 6-12 and 41-53.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the process of Cahn by hydrotreating the sulfur-containing stream as suggested by Carnell because sulfur content will be reduced. It also would have been obvious to one having ordinary skill in the art at the time the invention was made to have hydrotreated the permeate after separating it from the sweep stream or have hydrotreated the combined permeate/sweep stream because sulfur content will be equivalently reduced in either case.

*Allowable Subject Matter*

Claims 15, 16, 21, and 22 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: The prior art of record does not disclose or suggest the use of a decoupling agent as claimed.

*Conclusion*

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The prior art not relied upon discloses membrane separation processes.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Walter D. Griffin whose telephone number is 703-305-3774. The examiner can normally be reached on Monday-Friday 6:30 to 4:00 with alternate Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Marian Knode can be reached on 703-308-4311. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.



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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0651.



Walter D. Griffin  
Primary Examiner  
Art Unit 1764

WG

March 13, 2002